

PATENT CLAIMS

1. A process for machining, especially joining said workpieces (2) in the manufacture of body shells, wherein the workpieces (2) are conveyed by a conveyor (5) along a transfer line (3) and are machined by a plurality of said stationarily arranged, multiaxial robots (7, 8), **characterized in that** the workpieces (2) are conveyed continuously and machined by the robots (7, 8) during the forward movement, wherein the movements of the robots (7, 8) along the axes are synchronized with the conveying movement and wherein the movement and the position of the workpieces (2) are detected with a sensor system (13) and reported to a control system (12), which controls the conveyors (5) and the robots (7, 8).
2. A machining plant, especially joining plant, for the manufacture of body shells, comprising a conveyor (5) for the workpieces (2) and a plurality of said multiaxial robots (7, 8) arranged stationarily along the transfer line (3), **characterized in that** the conveyor (5) is designed as a continuously operating conveyor and the movements of the robots (7, 8) along their axes can be synchronized with the conveying movement for machining the moving workpieces (2), wherein the machining plant (1) has a sensor system (13) for detecting the movement and the position of the workpieces (2) and a control system (12), to which the conveyors (5), the sensor system (13) and the robots (7, 8) are connected.
3. A machining plant in accordance with claim 2, **characterized in that** the machining plant (1) has a monitoring system (11) for the synchronization of the movements of the robot.

4. A machining plant in accordance with claim 2 or 3, **characterized in that** the monitoring system (11) has one or more said means for optical imaging and evaluation.
5. A machining plant in accordance with claim 2, 3 or 4, **characterized in that** the monitoring system (11) is connected to the control system (12).
6. A machining plant in accordance with one of the above claims, **characterized in that** the robot controls have dynamized machining programs that can be synchronized on-line with the movement of the conveyor.
7. A machining plant in accordance with one of the above claims, **characterized in that** the robots (7, 8) are designed as multiaxial articulated arm robots, preferably as six-axis industrial robots.
8. A machining plant in accordance with one of the above claims, **characterized in that** the robots (7, 8) are arranged stationarily and on one side or on both sides of the transfer line (3).
9. A machining plant in accordance with one of the above claims, **characterized in that** the robots (7, 8) are arranged at equally spaced locations.
10. A machining plant in accordance with one of the above claims, **characterized in that** the conveyor (5) has a plurality of said conveying sections with independent drives connected to the control system (12).

11. A machining plant in accordance with one of the above claims, **characterized in that** the tools (2) are arranged and clamped on carriers, especially pallets.
12. A machining plant in accordance with one of the above claims, **characterized in that** the robots (7, 8) carry said joining tools (10), especially welding tools.
13. A machining plant in accordance with one of the above claims, **characterized in that** the machining plant (1) has a loading, clamping and checking station (14) at the input.
14. A machining plant in accordance with one of the above claims, **characterized in that** the machining plant (1) has a checking and unloading station (15) at the output.

Figure 5

KEY:

Bedienung und Visualisierung - Operation and visualization

Steuerung Werkzeuge - Control for tools

Steuerung Antriebe - Control for drives

Erfassung/Synchronization - Detection/synchronization

n-mal - n times

Sensorik zur Bewegungs- und Positionserfassung der Bauteile und Überwachungssysteme - Sensor system for the detection of the movement and position of the components and monitoring systems

S - sensor system

Ü - monitoring system

Positionsangaben - Position data

Istwerte an IR Steuerung - Actual values for IR control

Korrekturwerte - Correction values

Figure 6

(State of the Art)

KEY:

Abstand d - Distance d

Station ... - Station ...